

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Insecta Mundi

Center for Systematic Entomology, Gainesville,
Florida

12-31-2021

***Ishtarella thailandica* Martens, new genus, new species
(Hymenoptera: Braconidae: Aphidiinae) of aphid parasitoid from
Thailand, with a country checklist of Aphidiinae**

Abigail P. Martens

Matthew L. Buffington

Donald L.J. Quicke

Marisa Raweearamwong

Buntika A. Butcher

See next page for additional authors

Follow this and additional works at: <https://digitalcommons.unl.edu/insectamundi>



Part of the [Ecology and Evolutionary Biology Commons](#), and the [Entomology Commons](#)

This Article is brought to you for free and open access by the Center for Systematic Entomology, Gainesville, Florida at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Insecta Mundi by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Authors

Abigail P. Martens, Matthew L. Buffington, Donald L.J. Quicke, Marisa Raweearamwong, Buntika A. Butcher, and Paul J. Johnson

A journal of world insect systematics

INSECTA MUNDI

0904

Ishtarella thailandica Martens, new genus, new species
(Hymenoptera: Braconidae: Aphidiinae) of aphid parasitoid
from Thailand, with a country checklist of Aphidiinae

Abigail P. Martens

Insect Biodiversity Lab, South Dakota State University,
1030 North Campus Drive, Brookings, South Dakota, 57007, U.S.A.

Matthew L. Buffington

Systematic Entomology Laboratory, USDA-ARS c/o National Museum of Natural History, Smithsonian Institution,
10th & Constitution Ave NW, Washington DC, 20013, U.S.A.

Donald L. J. Quicke

Integrative Ecology Laboratory, Department of Biology, Faculty of Science, Chulalongkorn University,
Phayathai Road, Pathumwan, BKK 10330, Thailand

Marisa Raweearamwong

Integrative Ecology Laboratory, Department of Biology, Faculty of Science, Chulalongkorn University,
Phayathai Road, Pathumwan, BKK 10330, Thailand

Buntika A. Butcher

Integrative Ecology Laboratory, Department of Biology, Faculty of Science, Chulalongkorn University,
Phayathai Road, Pathumwan, BKK 10330, Thailand

Paul J. Johnson

Insect Biodiversity Lab, South Dakota State University,
1030 North Campus Drive, Brookings, South Dakota, 57007, U.S.A.

Date of issue: December 31, 2021

Center for Systematic Entomology, Inc., Gainesville, FL

Martens AP, Buffington ML, Quicke DLJ, Rawearamwong M, Butcher BA, Johnson PJ. 2021. *Ishtarella thailandica* Martens, new genus, new species (Hymenoptera: Braconidae: Aphidiinae) of aphid parasitoid from Thailand, with a country checklist of Aphidiinae. *Insecta Mundi* 0904: 1–6.

Published on December 31, 2021 by
Center for Systematic Entomology, Inc.
P.O. Box 141874
Gainesville, FL 32614-1874 USA
<http://centerforsystematicentomology.org/>

INSECTA MUNDI is a journal primarily devoted to insect systematics, but articles can be published on any non-marine arthropod. Topics considered for publication include systematics, taxonomy, nomenclature, checklists, faunal works, and natural history. *Insecta Mundi* will not consider works in the applied sciences (i.e. medical entomology, pest control research, etc.), and no longer publishes book reviews or editorials. *Insecta Mundi* publishes original research or discoveries in an inexpensive and timely manner, distributing them free via open access on the internet on the date of publication.

Insecta Mundi is referenced or abstracted by several sources, including the Zoological Record and CAB Abstracts. *Insecta Mundi* is published irregularly throughout the year, with completed manuscripts assigned an individual number. Manuscripts must be peer reviewed prior to submission, after which they are reviewed by the editorial board to ensure quality. One author of each submitted manuscript must be a current member of the Center for Systematic Entomology.

Guidelines and requirements for the preparation of manuscripts are available on the *Insecta Mundi* website at <http://centerforsystematicentomology.org/insectamundi/>

Chief Editor: David Plotkin, insectamundi@gmail.com

Assistant Editor: Paul E. Skelley, insectamundi@gmail.com

Layout Editor: Robert G. Forsyth

Editorial Board: Davide Dal Pos, Oliver Keller, M. J. Paulsen

Founding Editors: Ross H. Arnett, Jr., J. H. Frank, Virendra Gupta, John B. Heppner, Lionel A. Stange, Michael C. Thomas, Robert E. Woodruff

Review Editors: Listed on the *Insecta Mundi* webpage

Printed copies (ISSN 0749-6737) annually deposited in libraries

Florida Department of Agriculture and Consumer Services, Gainesville, FL, USA

The Natural History Museum, London, UK

National Museum of Natural History, Smithsonian Institution, Washington, DC, USA

Zoological Institute of Russian Academy of Sciences, Saint-Petersburg, Russia

Electronic copies (Online ISSN 1942-1354) in PDF format

Archived digitally by Portico

Florida Virtual Campus: <http://purl.fcla.edu/fcla/insectamundi>

University of Nebraska-Lincoln, Digital Commons: <http://digitalcommons.unl.edu/insectamundi/>

Goethe-Universität, Frankfurt am Main: <http://nbn-resolving.de/urn/resolver.pl?urn:nbn:de:hebis:30:3-135240>

Copyright held by the author(s). This is an open access article distributed under the terms of the Creative Commons, Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited. <http://creativecommons.org/licenses/by-nc/3.0/>

Ishtarella thailandica Martens, new genus, new species
(Hymenoptera: Braconidae: Aphidiinae) of aphid parasitoid
from Thailand, with a country checklist of Aphidiinae

Abigail P. Martens

Insect Biodiversity Lab, South Dakota State University,
1030 North Campus Drive, Brookings, South Dakota, 57007, U.S.A. abigail.martens@sdstate.edu

Matthew L. Buffington

Systematic Entomology Laboratory, USDA-ARS c/o National Museum of Natural History, Smithsonian Institution,
10th & Constitution Ave NW, Washington DC, 20013, U.S.A.

Donald L. J. Quicke

Integrative Ecology Laboratory, Department of Biology, Faculty of Science, Chulalongkorn University,
Phayathai Road, Pathumwan, BKK 10330, Thailand

Marisa Raweearamwong

Integrative Ecology Laboratory, Department of Biology, Faculty of Science, Chulalongkorn University,
Phayathai Road, Pathumwan, BKK 10330, Thailand

Buntika A. Butcher

Integrative Ecology Laboratory, Department of Biology, Faculty of Science, Chulalongkorn University,
Phayathai Road, Pathumwan, BKK 10330, Thailand

Paul J. Johnson

Insect Biodiversity Lab, South Dakota State University,
1030 North Campus Drive, Brookings, South Dakota, 57007, U.S.A.

Abstract. *Ishtarella* Martens **new genus** (Hymenoptera: Braconidae: Aphidiinae) and *I. thailandica* Martens **new species** are described and illustrated from Doi Phu Kha National Park, Nan Province, Thailand. The genus is assigned to the tribe Aphidiini, subtribe Trioxina. Based on morphology, *Ishtarella* appears most closely related to *Binodoxys* Mackauer. An updated checklist of the aphidiine fauna of Thailand, based on published records, is presented.

Key words. Taxonomy, biodiversity, Southeast Asia, Aphidiini, Trioxina, endoparasitoid, Aphididae.

ZooBank registration. urn:lsid:zoobank.org:pub:308E9BB3-E8F2-49D5-B69A-1585B60A5602

Introduction

Parasitoid wasps in the subfamily Aphidiinae (Hymenoptera: Braconidae) comprise about 60 genera and more than 650 species worldwide (Yu et al. 2016). The Aphidiinae of Thailand were all but unknown prior to a Thailand Inventory Group for Entomological Research (TIGER) project from 2006–2009 (Stary et al. 2008). As part of the TIGER project the Thai aphidiine fauna was surveyed using Malaise and pan traps; 20 species collectively representing 15 genera were reported from mixed deciduous or pine forests from 230 m to 2500 m above sea level (Stary et al. 2008, 2010a, 2010b). Although there are no identification keys to the Thai Aphidiinae, genus-level identifications can be made using the keys presented in Stary and Schlinger (1967), Stary and Ghosh (1983), Raychaudhuri (1990), and Chen and Shi (2001).

The new genus described herein is assigned to the tribe Aphidiini, subtribe Trioxina. Females of most genera in this subtribe possess an elongate and curved ovipositor sheath and ovipositor. Additionally, females of some genera, like *Binodoxys* Mackauer and *Trioxys* Haliday, possess distinctive hypopygial prongs that are used to hold and restrain the aphid host during oviposition (Völkl and Mackauer 2000).

Materials and Methods

This report is based on a single distinctive specimen collected at an ultraviolet light trap in the Doi Phu Kha National Park, Nan Province, Thailand. Sampling was done under National Park Permit 0907.4/18722. The type specimen will be deposited in the Insect Museum, Chulalongkorn University Museum of Natural History (NHMCU), Bangkok, Thailand.

Morphological terms follow Sharkey and Wharton (1997). Measurements were taken using a Leica MZ 9.5 and an ocular micrometer at 25× magnification. The specimen was imaged using a Macropod portable imaging system.

Taxonomy

Ishtarella Martens, new genus

Figures 1A–D, 2A–B

Diagnosis. This new genus is closely related to *Binodoxys* Mackauer, 1960 based on the presence of both primary spiracular tubercles and secondary tubercles on the petiole, the fusion of the tergite and sternite (T1 & S1) from the apex of the petiole past the level of the spiracular tubercles, the hypopygium of the female with paired elongate hypopygial prongs, and the elongate, tapering, slightly arcuate ovipositor sheath. *Ishtarella* is distinctive and distinguished from *Binodoxys* and related aphidiines by the presence of a pair of horn-like protuberances on the anterior portion of the mesoscutum (Fig. 1A), the absence of notauli but presence of broad, shallow grooves on the outer margins of the horn-like protuberances, and the presence of two small tubercles at the apex of the ovipositor sheath.

Description. (♀). Head transverse (Fig. 1B). Eyes medium-sized. Maxillary palps 2-segmented, labial palps 2-segmented. Antennae filiform, 11-segmented. Mesonotum entirely smooth with a pair of horn-like protuberances (Fig. 1A, 1C, 1D) present on the anterior portion of the mesoscutum; notauli absent but with a broad groove on the outer margin of each horn on the anterior portion of the pronotum. Fore wing hyaline, venation reduced, pterostigma subtriangular, R1 present, less than half the length of the pterostigma length, r&RS present and extending past apex of R1 as a tubular vein but not reaching wing margin. Hind-wing hyaline, venation reduced, C+SC+R present, with no closed cells. Petiole with primary (spiracular) and secondary tubercles; sternite and tergite fused from apical portion past secondary tubercles (Fig. 1A, 2A). Propodeum with medium-sized pentagonal areola bordered with distinct carinae (Fig. 2A). Hypopygium of female with elongate prongs, slightly curved toward apex, with elongate setae present on the dorsal surface (Fig. 2B). Ovipositor sheath elongate, slightly arcuate, and downward-curved with two small tubercles present at the apex (Fig. 1A, 2B).

Type species. *Ishtarella thailandica* Martens **new species.**

Distribution. Thailand.

Biology. Unknown.

Etymology. Named after the ancient Mesopotamian goddess Ishtar. On the Akkadian Cylinder Seal of Adda from c. 2250 B.C., the winged goddess Ishtar is depicted wearing a horned helmet reminiscent of the horn-like protuberances present on the mesoscutum of the wasp. The Latin diminutive suffix “-ella” refers to the small size of the wasp. The gender of the name is feminine.

Remarks. This genus keys to *Trioxys* in Starý and Schlinger (1967), Starý and Ghosh (1983), and Raychaudhuri (1990), and *Binodoxys* in Chen and Shi (2001) but is distinctive based on the mesoscutal horns.

Ishtarella thailandica Martens, new species

Figures 1A–D, 2A–B

Material examined. **Holotype THAILAND** • ♀; Nan Province, Doi Phu Kha N.P., 19°12.283' N, 101°04.802' E, 1350 m, Sept. 2018, U.V. light trap, M. Raweearamwong leg.



Figure 1. *Ishtarella thailandica* Martens gen. nov., sp. nov., ♀. **A)** Habitus, lateral view. **B)** Head, frontal view. **C)** Head and mesosoma, dorsal view; arrows indicate mesoscutal horns. **D)** Head and mesosoma, lateral view; arrow indicates mesoscutal horns.



Figure 2. *Ishtarella thailandica* Martens gen. nov., sp. nov., ♀. **A)** Propodeum and petiole, oblique view. **B)** Hypopygial prongs, ovipositor sheath, and ovipositor.

Description. *Female* – Length, 2.0 mm; length of antennae, 0.9 mm.

Head. Head short, transverse, head width 1.25 wider than mesosoma at tegulae. Compound eyes medium-sized, length:width ratio 1.0:0.95. Face with sparse setae (Fig. 1B). Malar space $0.75 \times$ eye length. Tentorio-ocular distance $2 \times$ inter-tentorial distance. Antenna filiform, 11-segmented; length $0.33 \times$ total body length; flagellar segment 1 (=F1) $5 \times$ longer than wide, with 3 medioventral placodes. F2 $5 \times$ longer than wide, 3 medioventral placodes, F1 the same length as F2.

Mesosoma. Mesonotum with notauli absent, with a few sparse setae present on the dorsal region (Fig. 1C). Mesoscutum with a pair of horn-like protuberances present on the anterior portion, and a broad groove on the outer margin of each horn (Fig. 1A, 1C, 1D). Propodeum with a medium-sized pentagonal areola bordered by distinct carinae (Fig. 2A). Fore wing with venation reduced, r&RS present and extending past the apex of R1 but not reaching wing margin. Pterostigma subtriangular; $1.5 \times$ as long as wide; pterostigma width $0.9 \times$ R1 length; subdiscal cell absent. Legs slender.

Metasoma. Petiole with primary (spiracular) and secondary tubercles distinct (Fig. 2A); $2.1 \times$ as long as width at primary tubercles; primary tubercles present at $0.4 \times$ times total petiole length measured from anterior; secondary tubercles present at $0.8 \times$ total petiole length measured from anterior; the distance between primary and secondary tubercles $1.2 \times$ the width of the petiole at the primary tubercles. Petiole dorsally rugose (Fig. 2A) with the sternite fused to tergite from the anterior portion of the petiole, past the level of the secondary tubercles, approximately $0.9 \times$ total petiole length (Fig. 1A, 2A). Tergites 2–7 sparsely setose, smooth and shining. Hypopygial prongs elongate, narrow, and slightly arcuate with 3 elongate setae present on the dorsal surface and a single short, basally-dilated bristle at the apex (Fig. 2B). Ovipositor sheath elongate and tapered, with two small tubercles present at the apex (Fig. 2B).

Color. Head dark brown. Antennae with scape, pedicel, F1 and F2 light yellowish, F3 medium brown, and F4–F9 dark brown. Thorax dark brown. Wings hyaline, venation brown. Fore leg wholly yellowish with apical tarsomere brown; middle leg yellowish with apical portion of femur and tibia and apical tarsomere brown; hind leg femur dark brown, tibia brown, and apical tarsomere dark brown. Abdomen dark brown; ovipositor sheath and prongs light brown.

Male. Unknown.

Host. Unknown.

Distribution. Thailand, Nan Province.

Habitat. This specimen was collected at an ultraviolet light trap in mixed deciduous montane dipterocarp forest, in September, at the end of the rainy season.

Etymology. The specific epithet “*thailandica*” refers to the country where the only known specimen was collected.

Checklist of Aphidiinae (Hymenoptera: Braconidae) from Thailand

The total number of Aphidiinae now known from Thailand is 21 species from 16 genera based on surveys by Starý et al. (2008, 2010a, 2010b) and this paper. All records of Aphidiinae from Thailand are from mixed deciduous, dipterocarp, or pine forests from 230 m to 2500 m above sea level.

Aphidius autriquei Starý, 1985 (Starý et al. 2008, 2010b)
 other *Aphidius* spp. Nees, 1818 (Starý et al. 2008, 2010b)
Archaphidius greenideae Starý and Schlinger, 1967 (Starý et al. 2008, 2010b)
Areopraon thailandicum Starý, 2008 (Starý et al. 2008)
Binodoxys indicus Subba Rao and Sharma, 1958 (Starý et al. 2010b)
 other *Binodoxys* spp. (Mackauer, 1965) (Starý et al. 2008, 2010b)
Bioxys japonicus Starý and Schlinger, 1967 (Starý et al. 2010b)
Diaeretus leucopterus (Haliday, 1834) (Starý et al. 2010b)
Ephedrus lacertosus (Haliday, 1833) (Starý et al. 2010b)
Ephedrus cf. *longistigmus* Gärdenfors, 1986 (Starý et al. 2008)
Fissicaudus conficius (Mackauer, 1962) (Starý et al. 2008)
Fissicaudus thailandicus Starý and Rakhshani, 2010 (Starý et al. 2010a, 2010b)
Indaphidius curvicaudatus Starý, 1979 (Starý et al. 2010b)
Ishtarella thailandica **gen. nov. sp. nov.** see above
Lipolexis gracilis Förster, 1863 (Starý et al. 2008, 2010b)
Lipolexis oregmae (Gahan, 1932) (Starý et al. 2008, 2010b)
Parabioxys songbaiensis Shi and Chen, 2001 in Chen and Shi 2001 (Starý et al. 2010b)
Pauesia spp. Quilis, 1931 (Starý et al. 2008)
Praon spp. Haliday, 1833 (Starý et al. 2008, 2010b)
Toxares shigai Takada, 1965 (Starý et al. 2008)
Trioxys spp. Haliday, 1833 (Starý et al. 2010b)

Discussion

The aphidiine fauna of Thailand remains poorly known. Their hosts belong entirely to the family Aphididae (Hemiptera), a principally temperate group of insects. In Thailand, and other tropical countries, aphids and their parasitoids tend to be found predominantly at higher, cooler altitudes. Very little is known of the Thai aphid fauna. The only available species list (Sirikajornjaru 2002) includes 170 species although 28% of these are only identified to morphospecies. As both the aphids and their parasitoids are under-recorded, we can expect many more species of aphidiines to be discovered in Thailand, with many new species yet to be described.

Acknowledgments

This work was supported by the Ratchadaphiseksomphot Endowment Fund (RCU_F64_006_23), Chulalongkorn University and RSPG to BAB; DLJQ was supported by a senior postdoctoral fellowship from the Rachadaphiseksomphot Fund, Graduate School, Chulalongkorn University and MR was supported by a CU Graduate School Thesis Grant and by the Research Assistantship Fund, Faculty of Science, Chulalongkorn University. APM and PJJ were supported by the United States Department of Agriculture, National Institutes of Food and Agriculture through the South Dakota Agricultural Experiment Station. We are grateful to Mr. Chatchai Yothawut (Director

of Doi Phu Kha National Park) for his support, and to the rangers for their help. We thank Emily R. Althoff and Louis F. Nastasi for presubmission reviews. Additionally, we thank William Bradford Smith, Smithsonian Institution, National Museum of Natural History for helping inspire the generic epithet of *Ishtarella thailandica*.

Literature Cited

- Chen J, Shi Q. 2001.** Systematic studies on Aphidiidae of China (Hymenoptera: Aphidiidae). Fujian Science and Technology Press; Fuzhou, China. 234 p. [In Chinese]
- Raychaudhuri D. 1990.** Aphidiids (Hymenoptera) of Northeast India. Indira Publishing House; Oak Park, MI. 155 p.
- Sharkey MJ, Wharton RA. 1997.** Morphology and terminology. p. 19–37. In: Wharton RA, Marsh PM, Sharkey MJ (eds.). Manual of the New World genera of the family Braconidae (Hymenoptera). International Society of Hymenopterists; Washington, DC. 439 p.
- Sirikajornjaru W. 2002.** Taxonomic study of aphids (Homoptera: Aphididae) in northern Thailand. Unpublished Ph.D. thesis, Mahidol University, Bangkok, Thailand. xiii + 325 p.
- Starý P, Ghosh AK. 1983.** Aphid parasitoids of India and adjacent countries (Hymenoptera, Aphidiidae). Zoological Survey of India Technical Monograph 7: 1–96.
- Starý P, Rakhshani E, Havelka J, Tomanovic Z, Kavallieratos NG, Sharkey MJ. 2010a.** Review and key to the world parasitoids (Hymenoptera: Braconidae: Aphidiinae) of Greenideinae aphids (Hemiptera: Aphididae), including notes on invasive pest species. *Annals of the Entomological Society of America* 103: 307–321.
- Starý P, Rakhshani E, Havelka J, Tomanovic Z, Kavallieratos NG, Sharkey MJ. 2010b.** Aphid parasitoids (Hymenoptera, Braconidae, Aphidiinae) from Thailand. *Zootaxa* 2498: 47–52.
- Starý P, Schlinger EI. 1967.** Revision of Far East Asian Aphidiidae (Hymenoptera). Series Entomologica, Vol. 3. Dr. W. Junk; The Hague. 204 p.
- Starý P, Sharkey M, Hutacharern C. 2008.** Aphid parasitoids sampled by Malaise traps in the National Parks of Thailand (Hymenoptera, Braconidae, Aphidiinae). *Thai Journal of Agricultural Science* 41: 37–43.
- Vökl W, Mackauer M. 2000.** Oviposition behavior of aphidiine wasps (Hymenoptera: Braconidae, Aphidiinae): Morphological adaptations and evolutionary trends. *The Canadian Entomologist* 132: 197–212.
- Yu DSK, Van Achterberg C, Horstmann K. 2016.** Taxapad 2016, Ichneumonoidea 2015. Database on USB flash drive. Ottawa, Ontario, Canada. Formerly available through <http://www.taxapad.com>.

Received November 16, 2021; accepted December 2, 2021.

Review editor Jessica Awad.